SUBSTITUTE CLAIMS

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1. Apparatus for limiting movement of a device in response to an input signal to a predetermined linear path in a two-axis system, said device being fixed to a two degree-of-freedom gyroscope that includes a first forcer for applying a torque with respect to a first rotor axis in response to said input signal to precess a rotor about a second, orthogonal rotor axis and a second forcer for applying torque to said rotor with respect to said second rotor axis in response to a second signal, said apparatus comprising at least one cross-axis circuit for receiving said input signal and deriving said second signal as the derivative of said input signal so that said second signal drives said second forcer to precess said rotor with respect to said first axis to substantially cancel an effect of torque applied by said first forcer with respect to said first axis of said rotor.

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3. Apparatus as defined in Claim 1 wherein a gain of said at least one cross-axis circuit is inversely proportional to a nutation frequency of said rotor.

4. Apparatus as defined in Claim 1 wherein a transfer function T(s) of said at least one cross-axis circuit is

$$T(s) = Ks/(s + 2\pi k f_{nut})$$

where k is an integer and f_{nut} is a nutation frequency of said rotor.

8. Apparatus as defined in Claim 7 wherein each cross-axis circuit generates an output signal comprising a derivative of an input signal.

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9. Apparatus as defined in Claim 8 wherein a gain of each cross-axis circuit is inversely proportional to a nutation frequency of said rotor.

10. Apparatus as defined in Claim 7 wherein a transfer function T(s) of each of said cross-axis circuits is

$$T(s) = Ks/(s + 2\pi k f_{nut})$$

where k is an integer and f_{nut} is a nutation frequency of said rotor.

13. Apparatus for substantially nulling coning motion in response to the slewing of a two-axis gyroscope of the type that includes a rotor comprising:

a) a first forcer for applying a torque with respect to a first axis of said rotor in response to a slewing input signal;

b) a second forcer for applying a torque to said rotor with respect to a second axis, orthogonal to said first axis, in response to a second signal; and

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c) a cross-axis circuit for receiving said slewing input signal and deriving said second signal as the derivative of said slewing input signal so that said second signal drives said second forcer to precess said rotor with respect to said first axis to substantially cancel an effect of torque applied to said rotor with respect to said first axis by said first forcer.

15. Apparatus as defined in Claim 13 wherein a transfer function of said cross-axis circuit is

$$Ks/(s + 2\pi k f_{nut})$$

where k is an integer and f_{nut} is a nutation frequency of said rotor.

17. A method for nulling a first oscillatory torque applied by a first forcer with respect to a first axis of a spinning gyroscope rotor to precess the rotor with respect to a second, orthogonal axis of the rotor, said method comprising the step of applying a second torque with respect to said second axis of said rotor, said second torque being the derivative of said first torque, to precess said rotor with respect to said first axis to substantially cancel an effect of said torque applied to said rotor with respect to said first axis by said first forcer.

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19. A method as defined in Claim 17 wherein said torque applied with respect to said second axis of said rotor is a function of a [the] nutation frequency of said rotor.

20. A method as defined in Claim 17 wherein the torque applied with respect to said second axis of said rotor is related to the torque applied with respect to said first axis of said rotor by

$$Ks/(s + 2\pi kf_{nut})$$

where f_{nut} is a nutation frequency of said rotor.

CHANGES MADE TO THE CLAIMS

Cancel Claims 2, 14 and 18 without prejudice.

Amend Claims 1, 3, 4, 8 through 10, 13, 15, 17, 19 and 20 as follows:

1. (Once amended) Apparatus for limiting movement of a device in response to an input signal to a predetermined linear path in [controlling the path of oscillatory travel of a device within] a two-axis system, said device being fixed to a two degree-of-freedom gyroscope that includes a first forcer for applying a torque with respect to a first rotor axis in response to said input [a first] signal to precess a [the] rotor about a second, orthogonal rotor axis and a second forcer for applying torque to said rotor with respect to said second rotor axis in response to a second signal, [wherein the angular displacement of said rotor from a null position generates a signal for activating motion to position said device within said two-axis system,] said apparatus comprising at least one cross-axis circuit for receiving said input [first] signal and deriving [generating] said second signal as the derivative of said input signal [in response thereto] so that said second signal drives said second forcer to precess said rotor with respect to said first axis to substantially cancel an [the] effect of torque applied by said first forcer with respect to said first axis of said rotor.

3. (Once amended) Apparatus as defined in Claim 1 [2] wherein a [the] gain of said at least one cross-axis circuit is inversely proportional to a [the] nutation frequency of said rotor.

4. (Once amended) Apparatus as defined in Claim 1 wherein a [the] transfer function T(s) of said at least one cross-axis circuit is

$$T(s) = Ks/(s + 2\pi k f_{nut})$$

where k is an integer and f_{nut} is a [the] nutation frequency of said rotor.

8. (Once amended) Apparatus as defined in Claim 7 wherein each cross-axis circuit generates an output signal comprising a [the] derivative of an input signal.

9. (Once amended) Apparatus as defined in Claim 8 wherein a [the] gain of each cross-axis circuit is inversely proportional to a [the] nutation frequency of said rotor.

10. (Once amended) Apparatus as defined in Claim 7 wherein <u>a</u> [the] transfer function T(s) of each of said cross-axis circuits is

$$T(s) = Ks/(s + 2\pi k f_{nut})$$

where k is an integer and f_{nut} is <u>a</u> [the] nutation frequency of said rotor.

13. (Once amended) Apparatus for substantially nulling <u>coning motion in response to the slewing of</u> [the effect of torque applied to precess the spinning rotor of] a <u>two-axis</u> gyroscope <u>of the type that includes a rotor</u> comprising:

a) a first forcer for applying a torque with respect to a first axis of said rotor in response to <u>a slewing input</u> [a first] signal;

b) a second forcer for applying a torque to said rotor with respect to a second axis, orthogonal to said first axis, in response to a second signal; and

c) a cross-axis circuit for receiving said <u>slewing input</u> [first] signal and <u>deriving</u> [generating] said second signal <u>as the derivative of said slewing input signal</u> so that said second signal drives said second forcer to precess said rotor with respect to said first axis to substantially cancel <u>an</u> [the] effect of torque applied to said rotor with respect to said first axis by said first forcer.

15. (Once amended) Apparatus as defined in Claim 13 wherein a [the] transfer function of said cross-axis circuit is

$$Ks/(s + 2\pi k f_{nut})$$

where k is an integer and f_{nut} is a [the] nutation frequency of said rotor.

17. (Once amended) A method for nulling a first oscillatory torque applied by a first forcer with respect to a first axis of a spinning gyroscope rotor to precess the rotor with respect to a second, orthogonal axis of the rotor, said method comprising the step of applying a second torque with respect to said second axis of said rotor, said second torque being the derivative of said first torque, to precess said rotor with respect to said first axis to substantially cancel an [the] effect of said torque applied to said rotor with respect to said first axis by said first forcer.

19. (Once amended) A method as defined in Claim 17 [18] wherein said torque applied with respect to said second axis of said rotor is a function of a [the] nutation frequency of said rotor.